

REVIEW ON MEDICINAL BENEFITS OF TRIDAX PROCUMBENS PHYTOCHEMICAL EXTRACTS

HANISHA YASMEEN K, NIVEDITHA S & RAMESH BABU P. B

Department of Genetic Engineering, Bharath Institute of Higher Education and Research, Selaiyur, Tambaram, Chennai, India

ABSTRACT

The medicinal properties of Tridax procumbens (T. procumbens) against the food pathogens Aspergillus species collected in different food samples. Lemon and rice culture were used for crude extracts preparation using ground leaves of the plant T. procumbens. Another method is to prepare extracts by adding ethanol to the crude extract. Antifungal activity can be assessed by isolating fungal organisms and cultured by “streak plate technique”. After 24 hours of incubation at room temperature and observed for inhibition of the fungal growth in the presence of extracts and the antifungal activity was observed after incubating them for one more day. Results of such studies can be used to analyse antifungal inhibition indicating the presence of a significant amount of antifungal activity in plant extracts of T procumbens.

KEYWORDS: Anti-Fungal Property, Tridax Procumbens, Aspergillus Nigar And Aspergillus Flavis, Rice & Lemon Culture

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INTRODUCTION

Traditionally herbal medicinal compounds have proven to show several therapeutic benefits and have been utilised several hundred years for curing several ailments in humans. In addition to modern antibiotics usefulness as antimicrobial, there are reports of several plant products proven to show antimicrobial activity in the treatment of various infectious diseases. Such studies have proven that they are efficacious and safe equivalent to synthetic antibiotics. The medicinal chemistry properties and physicochemical characteristics of plant based therapeutic products depend on the reactivity of such biomolecules with endotoxin and or microorganism itself without altering the other physiological or biochemical activities of the infected host. Considering the various medicinal properties of herbal products or edible fruits and vegetables, we have chosen for the antioxidant and anticancer property of a widespread flowering weed and pest plant namely *Tridax procumbens*.

Tridax Procumbens



Whole plant



Flower

Commonly known flowering plant of medicinal properties coat buttons or tridax daisy with species name *Tridax procumbens*. This known weed has previously been shown to exhibit medicinal properties and contains active biomolecules useful in various human ailments. This known weed is widely distributed in tropical Americas and it is distributed to grow in various parts of temperate zones and subtropical places worldwide. In United States, it has been reported to show pest status in nine states and is believed as harmful weed through it is known to contain active compounds with medicinal properties. This weed is reported to contain white centered in yellow surrounding or yellow colored flowers.

Scientific Classification

Binomial Name: *Tridax Procumbens*

Kingdom : Plantae

(unranked) : Angiosperms

(unranked) : Eudicots

(unranked) : Asterids

Order : Asterales

Family : Asteraceae

Tribe : Heliantheae

Genus : *Tridax*

Species : *T. Procumbens*

T. Procumbens is represented with various names, as Mexican daisy, Jayanti (in traditional ayurvedic and in siddha), in tamil Vettukkaaya-thalai and A kohadi (in folk). The medicinal properties of whole plant extracts have been shown to relieve various ailments associated with respiratory problems, dysentery, alopecia and anticoagulant properties. The most useful and promising medicinal properties of *T. procumbens* extract are known to show wound healing, immunomodulatory, anti-inflammatory, antimicrobial, bradycardiac effects. The medicinal important compounds in *T. procumbens* include steroids, flavanoids, quercetin, glycosides etc., [11,12].

The physicochemical constituents by spectroscopic and chemical analysis of this medicinal plant were reported to contain 3,6-dimethoxy-5,7,2',3',4'-pentahydroxyflavone 7-O- β -D-glucopyranoside (1) as chief constituent compound similar to flavanoids as reported by other medicinal plant extracts (1). Some of the medicinal properties of flavanoids of *T. procumbens* include anti-infective and anti-inflammatory activities and more mechanistic studies are required to understand the molecular and cellular targets of these compounds. In addition to flavanoids like compounds, earlier reported medicinal constituents include fatty acids, polysaccharides, sterol, esters etc and newly identified compounds include 3,6-Dimethoxy-5,7,2',3',4'-pentahydroxyflavone 7-O- β -D-glucopyranoside (1), named procumbetin. Yield: 0.016% on dried basis [11,12].

T. procumbens has long been used as herbal medicine for anti-oxidant and antibiotic efficacies with lots of potential therapeutic benefits proved by in vitro methods. In a few tribal areas in India, reported that juice extracts from the leaf can be used to heal wounds / injuries caused in skin, as anti-coagulant and as hair promoting agents, if used as liquid

suspension. Though a few studies reported certain noxious compounds in extracts, known benefits outweigh its negative values. Another study by Gamboa-Leon (2014) indicated that the extracts isolated from *Allium sativum* and *T. procumbens* demonstrated its usefulness as medicinal properties in cutaneous leishmaniasis and its remedial benefits proved it a suitable candidate for a possible novel phytomedicinal compound. In oral pharmacological studies using mice models showed that the mixture of *Tridax procumbens* and *A. sativum* extracts were promising in keeping the *Leishmania mexicana* infection in control and mice animal studies showed no toxicity in the oral toxicity assay [2].

The chemical constituents of *T. procumbens* were analysed using whole plant ethanolic extracts with indication that it contains various alkaloids and other medicinal compounds and a few compounds showed anti-arthritic effect, anti-hyperlipidemic and antidiabetic properties in using rat in vivo models with Freund's Complete Adjuvant (FCA) model and streptozotocin-induced diabetic model [7]. In the past literature, *T. Procumbens* has been reported as wound healing agent in traditional Indian medicine, in addition, its non medicinal property includes insect repellent property.

The plant extracts of *T. procumbens* was found beneficial in treating diarrhoea and dysentery. The phytochemical extracts from leaf were shown to bring remedy to certain infectious diseases of the skin when used as folk medicines. Similarly, the plant extract is popularly known as herbal or ayurvedic medicine for liver ailments or protective nature to liver besides acidity and related symptoms [4]. In traditional Indian medicine such as ayurveda *T. procumbens* plant extracts are used in the treatment of heat boils and related skin injuries and found its curing benefits in local population in Nalgonda and Warangal districts of Telangana, India. Another laboratory studies using animal cells such as using human prostate epithelial cells proved that *P. procumbens* plant extract showed anti-cancer activities using PC 3 cell line [8,9]. In certain tribal population in Udaipur, India claimed that this plant extract compounds demonstrated anti-diabetic activity [6]. Such studies used Glibenclamide as a reference standard, which demonstrated that *T. procumbens* flower extract exhibited antidiabetic activities [10]. Phatak et al., (1991) showed an improved activity in hair growth in animal models of wistar albino rats as well as in humans [5].

Chemical Composition of Leaves of *Tridax Procumbens*

Various phytochemical constituents of *T. procumbens* were analysed using *T. procumbens* stem and flower extracts in aqueous and non-aqueous forms. Organic solvents such as Chloroform was used to study the phytochemical constituents from leaves of *T. procumbens* Linn, which demonstrated the presence of Saponin, Coumarins, Steroid, Amino acids, Alkaloids, Diterpenes, Phenol and Flavonoids whereas Tannin, Emodins, Anthocyanin, Proteins, Emodins, Phytosterol, Phlobatannin, and Cardiac Glycosides were absent. Similarly studies using another organic solvent using Acetone-water of *T. procumbens* Linn extracts indicated the presence of similar phytochemical constituents [13,14,15].

Preparation of Crude Extract

Fresh leaves *T. procumbens* were used for extracting the phytochemical constituents and they were first cleaned and washed with deionised water so that the dust particles from the leaves were removed and later they washed once with the distilled water. Then plain paper was used to absorb the excess water from the washed fresh leaves. Ethanolic extracts of phytochemicals were prepared using *T. procumbens* leaves and they were mixed and or ground using mortar and pestle, initially grinding done without water or solvent after cleaning with pure water (Figure 1). Then such ground extract was filtered in a glass bottle or small glass bottle using a membrane filter paper. The sap having the colour of mild brown color is called the pure crude extract. The ethanolic extract was prepared similarly, but the use of ethanol is an additional step

involved. Later the extract was known ethanol extract, which had deep green colour appearance.



Figure 1: Crude and Ethanol Extracts of Plant *Tridax Procumbens*.

Potato Dextrose Agar

The preparation of Potato Dextrose Agar involves the use of Potato and carbohydrate source (dextrose) that encourage quicker fungal growth. Agar was used as the solidifying agent. Several common methods use a specific quantity of sterile tartaric acid (10%) to reduce the pH of this medium to 3.5. As per the standard methodology, 39 g of the medium was suspended water. Heat the mixture with regular shaking in flask and boil for one minute to make all plant extract components dissolve the medium. Sterilisation of such media preparation was done using autoclave at 121°C for 15 minutes. Similarly Mc Conkey Agar was prepared and used for further cultures. [11,12].

Isolation of Fungal Organisms

Aspergillus niger and *Aspergillus flavus* was used to grow on freshly prepared above medium and these organisms were made in rice and lemon cultures. From those fungal cultures, required amount of fungal specimens were separated. Two species namely *A.flavus* and *A.niger* were visualised with dye using slides (Figure 2).

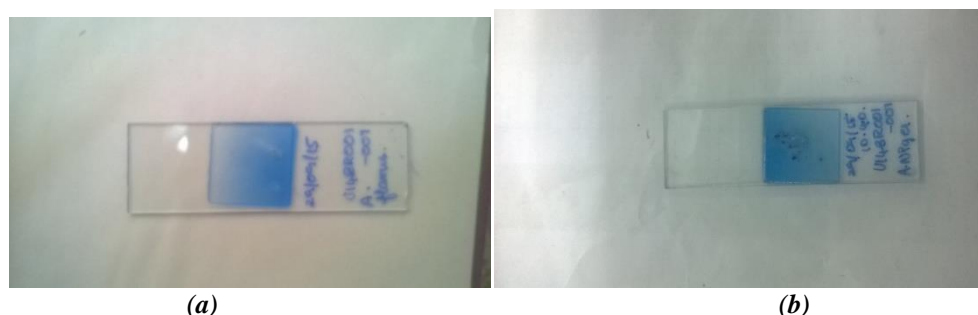


Figure 2: *Aspergillus Niger* (a) and *Aspergillus Flavus*(b).

A. niger of the genus *Aspergillus* was grown in culture and used for further studies. In literature, it is reported that they can cause black mould disease in a few vegetables and fruits. It is commonly distributed in soil, where their colonies can be confused with *Stachybotrys*. A few strains of *A. niger* have commonly been known to produce potent mycotoxins called ochratoxins; however, a few reports disagree such claims of those report, which was based upon misleading identification. Some true strains of *A. niger* which is known to produce ochratoxin A and additionally isoflavone orobol.

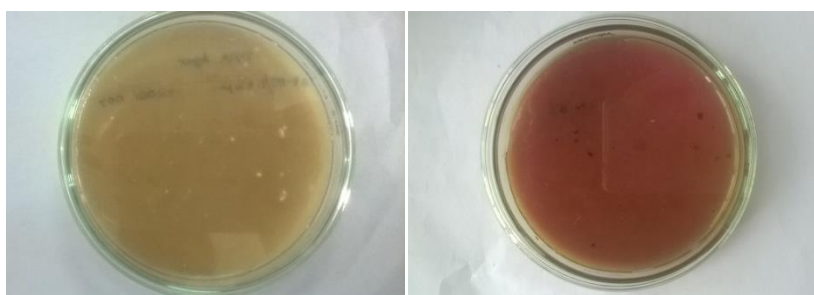
Aspergillus flavus

A. flavus is a saprotrophic and causes fungus with a cosmopolitan distribution and reportedly colonize in cereal and tree

nuts. During harvest season, post harvest rot was known to develop typically develops during storage, and/or transit. Though it is known as potentially infectious, a few strains of *A. flavus* release mycotoxins, which are toxic to mammals. *A. flavus* was also reported to cause aspergillosis in immunocompromised individuals. In laboratory diagnosis or investigations, they were streaked in petri plates in which the prepared culture agar was used for culture, revival and growth. A rapid qualitative separation method used in this study was streak plate method.

The lid of the agar plate needs to be kept open and while performing such a study, reduced quantity of agar was exposed. Before sterilising, the loop was cooled down by touching on agar plate and broth culture containing the mixture of bacteria was inoculated. Such inoculation was continued with all the plates used in the study. Sterilization of the inoculation loop is a very important step in such method.

Various samples of *T. procumbens* flower and plant extracts were in evaluation of anti microbial tests. The prepared plant extracts of *T. procumbens* was tested with various phytochemical extracts from ethanol by pouring in PDA media. Later the plates were shaken mildly to ensure even spreading of the samples throughout the media. The other two plates with different samples were incubated without pouring the extract and suitable controls were used in the study. After the incubation period, the fungicidal activity was tested (Figure 2 and 3).



(a) (b)

Figure 3: Antifungal Activity of Crude (a) and Ethanol (b) of Plant *Tridax Procumbens*.

In literature many medicinally important herbs and shrubs of Indian origin have been reported, which are known as important medicinal plants, in this paper we focussed to assess the anti fungal activity of the plant *T. procumbens*. In our studies, by observing the plates for 24 hours, our results indicated poor growth in the culture in which we have added the extracts. And then observing it after another 24 hours after adding the extracts to the plates containing the fungal growth helps us to find that the plate showed no difference in appearance as it was looked the day before. Based on our observation we concluded that the plant extracts of *T. procumbens* has antifungal activity. Our studies clearly demonstrated that the in culture plates the plant extracts inhibited the fungal growth in the case of first two plates and it stopped the further growth of fungi in the next two plates. Hence we conclude that the *T. procumbens* have anti-fungal activity and the streak plate technique is a more suitable method for assessing plants anti fungal property.

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